nTOF Session

Transformative Hadron Beamlines Workshop

July 21-23, 2014, Brookhaven National Laboratory

nTOF (white sources) Facilities

USA

Closed

USA

Table 1

Parameters of several neutron time-of-flight facilities. For the new facilities parameters still may improve

Facility	Location	Particle	Beam energy (MeV)	Neutron target	Pulse width (ns)	Beam power (kW)	Pulse frequency (Hz)	Flight path lengths (m)	Neutron production (n/pulse)
RPI	RPI, Troy, USA	e-	60	Ta	5	0.6	500	15–250	3.6×10^9
		e-	60	Ta	5,000	>10	300	15, 25	4.8×10^{11}
ORELA	ORNL, Oak Ridge, USA	e-	180	Ta	2–30	60	12–1,000	9–200	1×10^{12}
GELINA	EC-JRC-IRMM, Geel, Belgium	e-	100	U	1	10	40-800	5–400	4.3×10^{10}
nELBE	FZD, Rossendorf, Germany	e-	40	L-Pb	0.01	40	500,000	4	5.4×10^7
IREN	JINR, Dubna, Russia	e-	30	W	100	0.42	50	10–750	7.7×10^{10}
PNF	PAL, Pohang, Korea	e-	75	Ta	2,000	0.09	12	11	1.7×10^{10}
KURRI	Kumatori Japan	e-	46	Ta	2	0.046	300	10, 13, 24	2×10^9
		e-	30	Ta	4,000	6	100	10, 13, 24	8×10^{10}
LANSCE-MLNSC	LANL, Los Alamos, USA	p	800	W	135	80	20	7–60	7×10^{14}
LANSCE-WNR	LANL, Los Alamos, USA	p	800	W	0.2	1.44	13,900	8–90	8×10^9
n_TOF	CERN, Geneva, Switzerland	p	20,000	Pb	6	10	0.4	185	2×10^{15}
MLF-NNRI	J-PARC, Tokai, Japan	p	3,000	Hg	1,000	1,000	25	30	1.2×10^{17}

"HandAbook of Nuclear Engineering", vol I, Springer, ISBN: 978-0-387-98150-5, 2010

Items for Discussion

- **What are the requirements from a new nTOF facility ?**
  - Community interest
    - International ND meetings have about 450 attendees.
    - Only two TOF (white spectrum) facilities in the US (~7 elsewhere)
  - Possible Funding for n-TOF experiments
    - DOE - BES, NNSA, NE, NCSP, NR, other
    - NSF - astrophysics, high energy basic science.
    - Other ??
- **How can the BNL facility be different / better ?**
  - Large number of neutrons per pulse (>10^{15} n/pulse)
  - High energy resolution (~2 ns FWHM proton pulse, optimized production target and detection systems, long flight paths 200+m)
  - Short and long flight path (short enable very high n flux)
  - Propose NEW interesting experiments (scattering in the resonance region, fission physics, measurements of small and radioactive samples, surrogate reactions, high energy interactions E>1 GeV, nuclear structure measurement)